entities deposit or bind and from which a conductive substance is grown to form conductance, the formation of the complex itself or the deposition or binding of the nucleation center-forming entities themselves not yielding conductance, such conductance being formed only after growing said conductive substance.

37. (Twice Amended) An electric device for determining one or more targets in a sample, comprising

a microelectronic device having a plurality of layers, with a first group of conductors being defined as stripes in one or more first layers and a second group of conductors being defined as stripes in one or more second layers of the device with each of said second layers being separated from a first layer by a non-conductive substance, electrodes of the device being formed as open ends of the conductors by openings or cut-outs in a vertical direction through the layers;

each pair of electrodes forming part of an assay set, each assay set having a recognition moiety for binding a target bound to at least one of the electrodes or to a non-conductive substance present between the electrodes, said target after binding to the recognition moiety forming complex onto which nucleation center-forming entities deposit or bind for growing thereon a conductive substance that yields conductance between said pair of electrodes, the formation of the complex itself or the deposition or binding of the nucleation center-forming entities themselves not yielding conductance, such conductance being formed only after growing said conductive substance.

REMARKS

Claims 1-42 are pending herein. By this Amendment, the independent claims 1, 10, 24-26, 31, 35 and 37 are amended to recite that the required conductance between at least two electrodes is achieved only after growth of a conductive substance and "the formation of a complex between the recognition moiety and the target itself or the deposition or binding of

the monomers themselves to said complex not yielding a conductive bridge, such bridge being formed only after growing said conductive polymer." Support for the amendment is found in the specification at, for example, Figs. 10 and 12, page 29, line 20 to page 32, line 6, and page 46, line 16 to page 47, line 16.

For example, in Fig. 10 and related pages 29-32 of the present application, it is explained that first a path 312 between two electrodes is formed after which a metal coating is required in order to yield the required conductive bridge 320. The path 312 is formed by hybridization of the target 310 to the recognition moieties 306 and 308. However, the formation of the conductive bridge between the electrodes requires an addition step which begins with ion exchange. This then results in the deposition of metal ions 316 (nucleation center-forming entities) which are then reduced to form nucleation sites 318. Under this exemplary embodiment of the present invention, the nucleation centers grow and merge with each other to form a conductive bridge 320.

Likewise, Fig. 21 and related Example 12 of the present application teach that target nucleotides 504 bind to recognition moiety 503 forming a complex (recognition group 505). The assay device is then exposed to a solution containing gold colloids coupled to streptavidin units 507. The resulting assay device bears DNA molecules with pendant gold colloids 508 which are nucleation center-forming entities. In order to form the conductive bridge between the two electrodes, the assay device is further exposed to a solution containing a reducing agent and metal ions. The metal ions are reduced and deposited at the nucleation centers. The colloids then grow and merge to form the conductive path 509 bridging the two electrodes.

No new matter is added.

The attached Appendix includes a marked-up copy of each rewritten claim (37 C.F.R. §1.121(c)(1)(ii)).

Entry of the amendments is proper under 37 CFR §1.116 since the amendments: (a) place the application in condition for allowance for the reasons discussed herein; (b) do not raise any new issue requiring further search and/or consideration since the amendments amplify issues previously discussed throughout prosecution; (c) satisfy a requirement of form asserted in the previous Office Action; (d) do not present any additional claims without canceling a corresponding number of finally rejected claims; and (e) place the application in better form for appeal, should an appeal be necessary. The amendments are necessary and were not earlier presented because e.g. they are made in response to arguments raised in the final rejection. Entry of the amendments is thus respectfully requested.

I. Title

The Patent Office alleged that the title of the invention is not descriptive and is not clearly indicative of the invention to which the claims are directed.

By this Amendment, Applicants amend the title to recite "Detection of a Target in a Sample By Measuring Conductance of a Substance Grown from Nucleation Center-Forming Moieties."

Applicants submit that the amended title is clearly indicative of the invention to which the claims are directed, and respectfully request reconsideration and acceptance of the amended title.

II. Drawings

Applicants gratefully acknowledge that the proposed correction to Figure 30, filed on January 9, 2002, is approved. Applicants will submit formalized drawings, including the approved correction to Figure 30, in due course.

III. Rejection Under 35 U.S.C. §112, Second Paragraph

Claims 1-34, 36 and 42 were rejected by the Patent Office under 35 U.S.C. §112, second paragraph for allegedly being indefinite for failing to particularly point out and

distinctly claim the subject matter which Applicants regard as the invention. The rejection is respectfully traversed.

By this Amendment, the allegedly confusing phrase is revised to include sub-paragraph identifiers (i), (ii) and (iii) to more clearly define the three alternative modes of immobilization of the recognition moiety in the assay device.

In view of the foregoing, Applicants submit that claims 1-34, 36 and 42 fully comply with the requirements of 35 U.S.C. §112, second paragraph. Reconsideration and withdrawal of the rejection are respectfully requested.

IV. Rejection Under 35 U.S.C. §102(b)

Claims 1-9, 17-25, 30 and 42 were rejected by the Patent Office under 35 U.S.C. §102(b) as allegedly being anticipated by U.S. Patent No. 5,284,748 to Mroczkowski et al. (hereinafter " Mroczkowski "). The rejection is respectfully traversed.

Mroczkowski fails to anticipate the present invention because Mroczkowski fails to describe, either explicitly or implicitly, each and every aspect of the claimed invention. Instead, Mroczkowski describes a method for detecting the occurrence of a binding or complex-forming reaction between specific substances by utilizing the binding reaction to modify an electrical circuit, and then measuring a change in the electrical state of the circuit.

Mroczkowski discloses that a layer of the second of a pair of substances, i.e., the moiety that binds to the substance to be detected (essentially corresponding to the recognition moiety of the present application) must form a path between the pair of spaced-apart electrical conductors. This means that the Mroczkowski detection method requires that the gap between the two spaced apart electrodes has to be a priori essentially spanned by a layer of the second of the pair of substances (i.e., recognition moieties).

The present invention does not require or claim that the recognition moiety span the gap between the two electrodes. According to claim 1 of the present invention, the

recognition moiety may be "immobilized to (i) one or more of the at least two electrodes, (ii) onto a substrate between the at least two electrodes or to (iii) said one or more of the at least two electrodes and onto said substrate; the recognition moiety being capable of specific binding to one of the targets." The present invention does not require the recognition moiety to form a continuous path or to connect the electrodes as disclosed in Mroczkowski.

Further, Mroczkowski discloses that the first and second substances bound together must form aggregates, i.e., an association of a plurality of particles together, in order to provide a conductive bridge between the two spaced apart electrodes.

By this Amendment, the independent claims are amended to more explicitly recite that the present invention does not require an association of a plurality of complexes between the recognition moiety and the targets in order to form a bridge between the two electrodes. For example, claim 1 of the present invention now recites that "the formation of the complex itself or the deposition or binding of the nucleation center-forming entities themselves not yielding a conductive bridge, such bridge being formed only after growing said conductive substance."

In other words, the present invention now explicitly recites that it does not require formation of aggregates as described in Mroczkowski. In the present invention, there are a plurality of complexes between the recognition moiety and the targets. Only a single complex between a recognition moiety and a target is sufficient, after the growth of the conductive material, to form a conductive bridge between the two electrodes.

Thus, for the foregoing reasons, Applicants submit that Mroczkowski fails to anticipate the present invention. Reconsideration and withdrawal of the rejection are respectfully requested.

V. Rejections Under 35 U.S.C. §103(a)

A. Claims 12-16 and 29

Claims 12-16 and 29 were rejected by the Patent Office under 35 U.S.C. §103(a) as allegedly being obvious over Mroczkowski in view of JP 04-148669 (hereinafter "JP '669"). The rejection is respectfully traversed.

Claims 12-16 are dependent upon claim 1. Claim 29 is dependent upon claim 24. Like claim 1, claim 24 is amended to recite that "the formation of the complex itself or the deposition or binding of the nucleation center-forming entities themselves not yielding a conductive bridge, such bridge being formed only after growing said conductive substance."

As set forth extensively above, in the present invention there are a plurality of complexes between the recognition moiety and the targets. Only a single complex between a recognition moiety and a target is sufficient, after the growth of the conductive material, to form a conductive bridge between the two electrodes. Mroczkowski, however, requires the formation of aggregates, i.e., an association of a plurality of particles together, in order to provide a conductive bridge between the two spaced apart electrodes. The present invention now explicitly recites that it does not require formation of aggregates as described in Mroczkowski.

Further, the Patent Office admits that Mroczkowski fails to teach or suggest DNA as in the present invention.

JP '669 fails to remedy the deficiencies of Mroczkowski. JP '669 was relied upon by the Patent Office as allegedly teaching a molecule securing device in which a chain is formed by using two aluminum electrodes installed on a substrate.

Despite the teachings of JP '669 using DNA, JP '669 fails to render the present invention obvious because, like Mroczkowski, JP '669 fails to teach or suggest a system and method for assaying one or more targets in a sample comprising "reagents comprising

nucleation center-forming entities that deposit onto or bind to a complex formed between said recognition moiety and said target, and for growing a conductive substance from said deposited nucleation center-forming entities which yields a conductive bridge between at least two of the electrodes of a set, the formation of the complex itself or the deposition or binding of the nucleation center-forming entities themselves not yielding a conductive bridge, such bridge being formed only after growing said conductive substance" as recited in claims 1 and 24 of the present application.

Further, nothing in JP '669 would have motivated one of ordinary skill in the art to have combined the teachings of JP '669 with Mroczkowski to develop the present invention.

For the foregoing reasons, Applicants submit that Mroczkowski and JP '669, whether taken singly or in combination, fail to teach or suggest the present invention. Reconsideration and withdrawal of the rejection are respectfully requested.

B. Claims 31-33

Claims 31-33 were rejected by the Patent Office under 35 U.S.C. §103(a) as allegedly being obvious over Mroczkowski. The rejection is respectfully traversed.

Independent claim 31, like claim 1, is amended to recite that "the formation of the complex itself or the deposition or binding of the nucleation center-forming entities themselves not yielding a conductive bridge, such bridge being formed only after growing said conductive substance." Claims 32 and 33 are dependent upon claim 31.

As set forth extensively above, in the present invention there are a plurality of complexes between the recognition moiety and the targets. Only a single complex between a recognition moiety and a target is sufficient, after the growth of the conductive material, to form a conductive bridge between the two electrodes. Mroczkowski, however, requires the formation of aggregates, i.e., an association of a plurality of particles together, in order to provide a conductive bridge between the two spaced apart electrodes. The present invention

now explicitly recites that it does not require formation of aggregates as described in Mroczkowski.

Further to failing to teach or suggest the present system and method for assaying a target, Mroczkowski also fails to teach or suggest the kit of claims 31-33.

In particular, Mroczkowski fails to teach or suggest a kit for assaying a sample comprising at least two electrodes and a recognition moiety immobilized either to one or more of the at least two electrodes and/or onto a substrate between the at least two electrodes. Mroczkowski also fails to teach a recognition moiety capable of specific binding to one of the targets.

By admission of the Patent Office, Mroczkowski fails to teach or suggest a kit. From the teachings of Mroczkowski, one may be able to design a kit in which a conducting substance is used to coat an outer surface of a layer of target molecules, but the teachings and suggestions of Mroczkowski would not have led one to make use of reagents according to the present invention to form a conducting bridge by growing a conducting substance from nucleation centers, wherein the formation of said complex itself or the deposition or binding of said nucleation center-forming entities to said complexes themselves not yielding said conductive bridge, such conductive bridge being formed only after growing said conductive substance.

For the foregoing reasons, Applicants submit that Mroczkowski fails to teach or suggest the present invention. Reconsideration and withdrawal of the rejection are respectfully requested.

C. Claims 35-41

Claims 35-41 were rejected by the Patent Office under 35 U.S.C. §103(a) as allegedly being obvious over Mroczkowski in view of U.S. Patent No. 5,914,505 to Hisada et al. (hereinafter "Hisada"). The rejection is respectfully traversed.

By this Amendment, independent claims 1, 24, 35 and 37 are amended to explicitly recite that "the formation of the complex itself or the deposition or binding of the nucleation center-forming entities themselves not yielding a conductive bridge, such bridge being formed only after growing said conductive substance." Claims 36 and 41 are dependent upon independent claim 35, claim 38 is dependent upon independent claim 1, and claims 39, 40 and 42 are dependent upon independent claim 24.

As set forth extensively above, in the present invention there are a plurality of complexes between the recognition moiety and the targets. Only a single complex between a recognition moiety and a target is sufficient, after the growth of the conductive material, to form a conductive bridge between the two electrodes. Mroczkowski, however, requires the formation of aggregates, i.e., an association of a plurality of particles together, in order to provide a conductive bridge between the two spaced apart electrodes. The present invention now explicitly recites that it does not require formation of aggregates as described in Mroczkowski.

Further, and as also set forth above, Mroczkowski fails to teach or suggest a kit for assaying a sample comprising at least two electrodes and a recognition moiety immobilized either to one or more of the at least two electrodes and/or onto a substrate between the at least two electrodes. Mroczkowski also fails to teach that the recognition moiety is capable of specific binding to one of the targets.

By admission of the Patent Office, Mroczkowski fails to teach or suggest a kit and/or junction forming diodes as recited in claim 35 of the present application. From the teachings of Mroczkowski, one may be able to design a kit in which a conducting substance is used to coat an outer surface of a layer of target molecules, but the teachings and suggestions of Mroczkowski would not have led one to make use of reagents according to the present invention to form a conducting bridge comprising polymerized monomers of a conducting

polymer bound to the target or to the complex formed between the recognition moiety and target and for growing a conductive substance from said deposited or bound nucleation center-forming entities that yields a conductive bridge between at least two of the electrodes of a set, the formation of said complex itself or the deposition or binding of said nucleation center-forming entities to said complexes themselves not yielding said conductive bridge, such conductive bridge being formed only after growing said conductive substance.

Hisada fails to remedy the deficiencies of Mroczkowski. Hisada teaches a semiconductor integrated circuit. Hisada was made to solve the problem of large output noises, achieved by the formation of a multibit structure. (See column 1, lines 26-36). Even if Hisada describes the multiplexed system as alleged by the Patent Office, the construction described by Hiasada is for the purpose of preventing the malfunction of an internal circuit due to output noises and not for the simultaneous detection of several targets.

The present invention does not claim multiplexed systems, but does claim the construction of assay arrays in such a way so as to detect a number of targets simultaneously. Hisada would not have been relied upon by one of ordinary skill in the art because it is not analogous art.

Thus, Applicants submit that one would not have been motivated to have combined the teachings of Mroczkowski and Hisada to produce the present invention.

For the foregoing reasons, Applicants submit that Mroczkowski and Hisada, whether taken singly or in combination, fail to teach or suggest the present invention.

D. Claims 10, 11, 26-28 and 34

Claims 10, 11, 26-28 and 34 were rejected by the Patent Office under 35 U.S.C. §103(a) as allegedly being obvious over Mroczkowski in view of U.S. Patent No. 5,563,424 to Yang et al. (hereinafter "Yang"). The rejection is respectfully traversed.

The independent claims of the present application are amended to recite that "the formation of the complex itself or the deposition or binding of the nucleation center-forming entities themselves not yielding a conductive bridge, such bridge being formed only after growing said conductive substance."

As set forth extensively above, in the present invention there are a plurality of complexes between the recognition moiety and the targets. Only a single complex between a recognition moiety and a target is sufficient, after the growth of the conductive material, to form a conductive bridge between the two electrodes. Mroczkowski, however, requires the formation of aggregates, i.e., an association of a plurality of particles together, in order to provide a conductive bridge between the two spaced apart electrodes. The present invention now explicitly recites that it does not require formation of aggregates as described in Mroczkowski.

As admitted by the Patent Office, Mroczkowski fails to teach or suggest polyaniline.

Yang fails to remedy the deficiencies of Mroczkowski. Yang was merely relied upon by the Patent Office as describing polymer grids comprising a body of an electrically conducting organic polymer such as polyaniline. According to Yang, the polymer grid is prepared, i.e., polymerized, and then incorporated onto the electronic device to form a homogeneous coating of the device. This homogeneous film may be in the form of a thin film.

The present invention, however, makes use of the monomers of polyaniline. In the present invention, it is only after binding to a complex formed between the target and the recognition moiety that the monomers start to polymerize to form the conducting bridge. Thus, unlike Yang, in the present invention, if the complex has not formed, no polymer is present.

Further, the polymer grids of Yang are known to affect electronic performance and light emission. Therefore, even if one were to hypothetically assume that the Yang polymer grids are present in the present invention (which is not the case), Yang does not teach or suggest the use of such polymer grids for the detection, either qualitative or quantitative, of a target in a sample that is complexed to an immobilized recognition moiety.

Thus, nothing taught or suggested in Yang would have motivated one to have combined the teachings of Yang with Mroczkowski to produce the present invention.

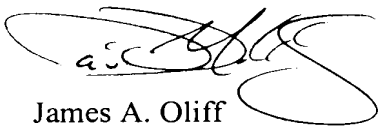
For the foregoing reasons, Applicants submit that Mroczkowski and Yang, whether taken singly or in combination, fail to teach or suggest the present invention. Reconsideration and withdrawal of the rejection are respectfully requested.

VI. Conclusion

In view of the foregoing amendments and remarks, Applicants submit that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1-42 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in better condition for allowance, the Examiner is invited to contact Applicants' undersigned representative at the telephone number listed below.

Respectfully submitted,



James A. Oliff
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JAO:DML/rxg

Attachment:
Appendix

Date: July 25, 2002

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DEPOSIT ACCOUNT USE AUTHORIZATION
Please grant any extension necessary for entry;
Charge any fee due to our Deposit Account No. 15-0461

APPENDIX

Changes to Title:

The following is a marked-up version of the amended title:

DETECTION OF A TARGET IN A SAMPLE BY MEASURING CONDUCTANCE OF A SUBSTANCE GROWN FROM NUCLEATION CENTER-FORMING MOIETIES

Changes to Claims:

1. (Twice Amended) A system for assaying one or more targets in a sample, comprising:

(a) an assay device having one or more assay sets at least one for each target to be assayed; each of the assay sets comprising at least two electrodes and a recognition moiety immobilized to (i) one or more of the at least two electrodes, (ii) onto a substrate between the at least two electrodes or to (iii) said one or more of the at least two electrodes and onto said substrate; the recognition moiety being capable of specific binding to one of the targets;

(b) an electric or electronic module for determining electric conductance between the at least two electrodes of each assay set; and

(c) reagents comprising ~~for growing a conducting substance from~~ nucleation center-forming entities ~~deposited~~ that deposit onto or ~~bound~~ bind to a complex formed between said recognition moiety and said target, and for growing a conductive substance from said deposited nucleation center-forming entities which yields ~~which substance forms~~ a conductive bridge between at least two of the electrodes of a set, the formation of the complex itself or the deposition or binding of the nucleation center-forming entities themselves not yielding a conductive bridge, such bridge being formed only after growing said conductive substance.

10. (Twice Amended) A system for assaying one or more targets in a sample, comprising:

(a) an assay device having one or more assay sets at least one for each target to be assayed; each of the assay sets comprising at least two electrodes and a recognition moiety immobilized to one or more of the at least two electrodes, immobilized on a substrate between the at least two electrodes or immobilized to said one or more of the at least two electrodes and onto said substrate; the recognition moiety being capable of specific binding to one of the targets;

(b) an electric or electronic module for determining electric conductance between the at least two electrodes of each assay set; and

(c) reagents comprising monomers of a ~~conducting~~ conductive polymer which ~~can~~ deposit onto or bind to a complex formed between said recognition moiety and said target, and for growing a conductive polymer from deposited or bound monomers, such that upon polymerization of the monomers a ~~conducting~~ conductive bridge between the at least two electrodes of a set is formed, the formation of a complex between the recognition moiety and the target itself or the deposition or binding of the monomers themselves to said complex not yielding a conductive bridge, such bridge being formed only after growing said conductive polymer.

24. (Twice Amended) A method for assaying one or more targets in a sample comprising:

(a) providing an assay device having one or more assay sets at least one for each target to be assayed; each of the assay sets comprising at least two electrodes and a recognition moiety immobilized to one or more of the at least two electrodes; on a substrate between the at least two electrodes or to said one or more if the at least two electrodes and onto said substrate; the recognition moiety being capable of specific binding to one of the targets;

(b) contacting said assay device with said sample under conditions permitting binding of targets to specific recognition moieties;

(c) contacting said device with a first reagent solutions ~~to form~~ comprising nucleation-center forming entities ~~on~~ for depositing onto or binding to complexes formed between a target and a recognition moiety;

(d) connecting said device with a second reagent solution to grow a ~~conducting~~ conductive metal substance from said nucleation center-forming entities for a time sufficient to yield a conductive bridge between said at least two electrodes, the formation of a complex between the recognition moiety and the target itself or the deposition or binding of nucleation center-forming entities to said complexes themselves not yielding said conductive bridge, such conductive bridge being formed only after growing said conductive metal substance;

(e) connecting said at least two electrodes to an electric or electronic module to measure conductance between said at least two electrodes; and

determining conductance between said at least two electrodes, conductance above a threshold conductance indicating the presence of a respective target in the sample.

25. (Twice Amended) A method for assaying one or more targets in a sample, comprising:

(a) reacting the sample targets with a first reagent solution ~~to bind~~ comprising nucleation-center forming entities to deposit or bind said nucleation center-forming entities to said targets;

(b) providing an assay device having one or more assay sets at least one for each target to be assayed; each of the assay sets comprising at least two electrodes and a recognition moiety immobilized to (i) one or more of the at least two electrodes, (ii) on a substrate between the at least two electrodes or (iii) to said one or more of the at least two electrodes and onto said substrate; the recognition moiety being capable of specific binding to one of the targets;

(c) contacting said assay device with said sample under conditions permitting binding of targets to specific recognition moieties;

(d) contacting said device with a second reagent solution to grow a ~~conducting~~ conductive metal substance from said nucleation center-forming entities for a time sufficient to yield a conductive bridge between said at least two electrodes, the formation of a complex between the recognition moiety and the target itself or the deposition or binding of nucleation center-forming entities to said complexes themselves not yielding said conductive bridge, such conductive bridge being formed only after growing said conductive metal substance;

(e) connecting said at least two electrodes to an electric or electronic module to measure conductance between said at least two electrodes; and

(f) determining conductance between said at least two electrodes, conductance above a threshold conductance indicating the presence of a respective target in the sample.

26. (Twice Amended) A method for assaying one or more targets in a sample, comprising:

(a) providing an assay device having one or more assay sets at least one for each target to be assayed; each of the assay sets comprising at least two electrodes and a recognition moiety immobilized either to (i) one or more of the at least two electrodes, (ii) on a substrate between the at least two electrodes or (iii) to said one or more of the at least two electrodes and onto said substrate; the recognition moiety being capable of specific binding to one of the targets;

(b) contacting said assay device with said sample under conditions permitting binding of targets to specific recognition moieties;

(c) contacting said device with a first reagent solution comprising monomers of a conductive polymer such that said monomers can bind to complexes formed between the targets and recognition moieties;

(d) treating said device such that said monomers will polymerize to form a ~~conducting~~ conductive polymer, such that upon polymerization of the monomers a conductive bridge between the at least two electrodes of at least one set is formed, the formation of complexes between the recognition moieties and the targets themselves or the deposition or binding of the monomers to said complexes itself not yielding a conductive bridge, such bridge being formed only after growing said conductive polymer ~~and thereby forming a conducting bridge between at least two electrodes of at least one assay set~~; and

(e) determining a conductance between said at least two electrodes, conductance above a threshold conductance indicating the presence of a respective target in the sample.

31. (Twice Amended) A kit for use in assaying one or more targets in a sample, comprising:

(a) an assay device having one or more assay sets at least one for each target to be assayed; each of the assay sets comprising at least two electrodes and a recognition moiety immobilized (i) to one or more of the at least two electrodes, (ii) onto a substrate between the at least two electrodes or (iii) to said one or more of the at least two electrodes and onto said substrate; the recognition moiety being capable of specific binding to one of the targets; and

(b) reagents comprising nucleation center-forming entities that deposit or bind to a complex formed between said recognition moiety and said target and for growing a ~~conducting~~ conductive substance from said deposited or bound nucleation center-forming entities ~~deposited onto or bound to a complex formed between said recognition moiety and said target, which substance forms~~ that yields a conductive bridge between at least two of the electrodes of a set, the formation of said complex itself or the deposition or binding of said nucleation center-forming entities to said complexes themselves not yielding said conductive bridge, such conductive bridge being formed only after growing said conductive substance.

35. (Twice Amended) An electronic device for determining one or more targets in a sample, comprising:

an integrated circuit comprising the first group of N_1 conductors and a second group of N_2 conductors, defining between them N_1xN_2 junctions, each such junction being formed with an electronic module comprising two electrodes, each one linked to or defined as an integral portion of one of the conductors, and comprises a diode or non-linear component permitting current flow through the electronic module only in the direction from the first group of conductors to the second group of conductors, whereby a current flowing between one conductor of the first group to one conductor of the second group of conductors defines a single junction point between them; each pair of electrodes forming part of an assay set, each assay set having a recognition moiety for binding a target, bound to at least one of the electrodes or to a ~~non-conducting~~ non-conductive substance disposed between the electrodes, said target after binding to the recognition moiety ~~forming a nucleation center for growing thereon a conducting substance~~ to form a complex onto which nucleation center-forming entities deposit or bind and from which a conductive substance is grown to form conductance, the formation of the complex itself or the deposition or binding of the nucleation center-forming entities themselves not yielding conductance, such conductance being formed only after growing said conductive substance.

37. (Twice Amended) An electric device for determining one or more targets in a sample, comprising

a microelectronic device having a plurality of layers, with a first group of conductors being defined as stripes in one or more first layers and a second group of conductors being defined as stripes in one or more second layers of the device with each of said second layers being separated from a first layer by a ~~non-conducting~~ non-conductive substance, electrodes

of the device being formed as open ends of the conductors by openings or cut-outs in a vertical direction through the layers;

each pair of electrodes forming part of an assay set, each assay set having a recognition moiety for binding a target bound to at least one of the electrodes or to a ~~non-conducting~~ non-conductive substance present between the electrodes, said target after binding to the recognition moiety forming ~~a~~ complex onto which nucleation center-forming entities deposit or bind for growing thereon a ~~conducting~~ conductive substance ~~to form conductance~~ that yields conductance between said pair of electrodes, the formation of the complex itself or the deposition or binding of the nucleation center-forming entities themselves not yielding conductance, such conductance being formed only after growing said conductive substance.